

# PIC Microcontroller and Embedded Systems

## The PIC Microcontroller Features

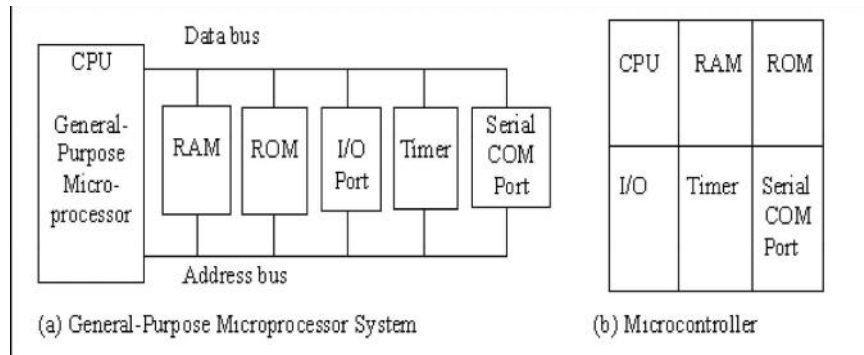
1

## Objective

- Compare and contrast uP and uC
- Describe the advantages of uC
- Explain the concept of ES
- Describe criteria for considering a uC
- Compare and contrast the various of the PIC Family
- Compare the PIC with uC offered by others

2

## Microprocessor System Contrasted With Microcontroller System



3

## Overview of the PIC18 Family

- An 8-bit uController called PIC is introduced in 1989 by Microchip Technology Corporation
- It includes
  - Small Data Ram
  - Few bytes of Rom
  - One timer
  - I/O ports

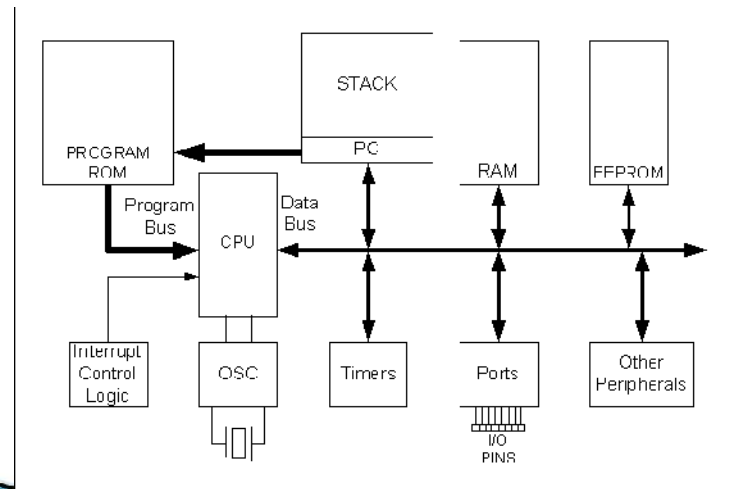
### PIC 18 Feathers

#### RISC Architecture

On-chip program, Code, ROM  
 Data EEPROM  
 Timers  
 ADC  
 USART  
 I/O Ports

4

## Simplified View of a PIC Microcontroller



5

## PIC Memory

- PIC 18 can support up to 2MB
  - Generally, they come with 4KB – 128KB
  - Available in flash, OTP, UV-EPROM, and Masked
- Max. 4096 Bytes (4 kB) of data RAM space
- Data RAM space has two components
  - Varied GPR, General Purpose RAM
  - For read/write and data manipulation
- Divided into banks of 256 B
- Fixed SFR, Special Function Registers
- Some of PICs have a small amount of EEPROM
- Used for critical data storing

6

PIC18 Microcontroller Family													
Product	Program Memory Type	Memory Bytes	Data Memory		I/O Ports	ADC 10-bit	MSSP	USART	Other	CCP/ Timers		Packages	Pins
			RAM Bytes	EEPROM Bytes						PWM	8/16-bit		
PIC18F1220	FLASH	4K	256	256	16	7	—	1	6x PWM	1	1/3	DIP SOIC, SSOP QFN	18
PIC18F1320	FLASH	8K	256	256	16	7	—	1	6x PWM	1	1/3	DIP SOIC, SSOP QFN	18
PIC18F220	FLASH	4K	512	256	23	10	IC/SPI	1	6x PWM	2	1/3	DIP SOIC	28
PIC18F2320	FLASH	8K	512	256	23	10	IC/SPI	1	6x PWM	2	1/3	DIP SOIC	28
PIC18C242	OTP	16K	512	—	23	5	IC/SPI	1	—	2	1/3	DIP SOIC	28
PIC18C252	OTP	32K	1536	—	23	5	IC/SPI	1	—	2	1/3	DIP SOIC	28
PIC18F242	FLASH	16K	512	256	23	5	IC/SPI	1	—	2	1/3	DIP SOIC, SSOP	28
PIC18F252	FLASH	32K	1536	256	23	5	IC/SPI	1	—	2	1/3	DIP SOIC, SSOP	28
PIC18F258	FLASH	32K	1536	256	22	5	IC/SPI	1	CAN 2.0B	1	1/3	DIP SOIC	28
PIC18F4220	FLASH	4K	512	256	34	13	IC/SPI	1	6x PWM	2	1/3	DIP TOFP QFN	40/44
PIC18F4320	FLASH	8K	512	256	34	13	IC/SPI	1	6x PWM	2	1/3	DIP TOFP QFN	40/44
PIC18C442	OTP	16K	512	—	34	8	IC/SPI	1	—	2	1/3	DIP LQCC, TQFP	40/44
PIC18C452	OTP	32K	1536	—	34	8	IC/SPI	1	—	2	1/3	DIP LQCC, TQFP	40/44
PIC18F442	FLASH	16K	512	256	34	8	IC/SPI	1	—	2	1/3	DIP LQCC, TQFP	40/44
PIC18F452	FLASH	32K	1536	256	34	8	IC/SPI	1	—	2	1/3	DIP LQCC, TQFP	40/44
PIC18F458	FLASH	32K	1536	256	33	5	IC/SPI	1	CAN 2.0B	1	1/3	DIP LQCC, TQFP	40/44
PIC18C601	—	ROMless	1536	—	31	8	IC/SPI	1	—	2	1/3	PQCC, TQFP	64/65
PIC18C658	OTP	32K	1536	—	32	12	IC/SPI	1	CAN 2.0B	2	1/3	PQCC, TQFP	64/65
PIC18F520	FLASH	32K	2048	1024	52	12	IC/SPI	2	—	5	2/3	TQFP	64
PIC18F620	FLASH	64K	3840	1024	52	12	IC/SPI	2	—	5	2/3	TQFP	64
PIC18F720	FLASH	128K	3840	1024	52	12	IC/SPI	2	—	5	2/3	TQFP	64
PIC18C801	—	ROMless	1536	—	42	12	IC/SPI	1	—	2	1/3	PQCC, TQFP	80/84
PIC18C858	OTP	32K	1536	—	58	15	IC/SPI	1	CAN 2.0B	2	1/3	PQCC, TQFP	80/84
PIC18F520	FLASH	32K	2048	1024	58	15	IC/SPI	2	EMA	5	2/3	TQFP	80
PIC18F620	FLASH	64K	3840	1024	58	15	IC/SPI	2	EMA	5	2/3	TQFP	80
PIC18F720	FLASH	128K	3840	1024	58	15	IC/SPI	2	EMA	5	2/3	TQFP	80

Abbreviations: ADC = Analog-to-Digital Converter    CCP = Capture/Compare/PWM    IC = Inter-Integrated Circuit Bus    PWM = Power Manager Mode  
 PWM = Pulse Width Modulation    SPI = Serial Peripheral Interface    USART = Universal Synchronous/Asynchronous Receiver/Transmitter